

## ***Stylidium* miscellany 1: typifications and new taxa from south-west Western Australia**

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### **Abstract**

Wege, J.A. *Stylidium* miscellany 1: typifications and new taxa from south-west Western Australia. *Nuytsia* 20: 79–108 (2010). The types of names relating to 24 species of *Stylidium* from south-west Western Australia are reviewed. Lectotypes are selected for *S. barleei* F.Muell., *S. breviscapum* var. *erythrocalyx* Benth., *S. ciliatum* Lindl., *S. ciliatum* var. *minor* Sond., *S. dispernum* F.Muell., *S. elongatum* Benth., *S. galioides* C.A.Gardner, *S. imbricatum* Benth., *S. lepidum* F.Muell. ex Benth., *S. limbatum* F.Muell., *S. miniatum* Mildbr., *S. piliferum* R.Br., *S. plantagineum* Sond., *S. preissii* (Sond.) F.Muell., *S. verticillatum* F.Muell. and *S. yilgarnense* E.Pritz. Neotypes are nominated for *S. pritzelianum* Mildbr., *S. pseudocaesпитosum* Mildbr. and *S. stenosepalum* E.Pritz. *Stylidium piliferum* subsp. *minor* (Mildbr.) Carlquist is lectotypified and placed into synonymy under *S. piliferum*. *Stylidium elegans* J.Drumm. is newly established as a synonym of *S. plantagineum* and a lectotype designated. *Stylidium involucreatum* F.Muell. is reinstated and *S. stowardii* M.B.Scott placed into synonymy. The collector of the type of *S. glaucum* (Labill.) Labill. is confirmed as Leschenault de la Tour. *Stylidium thesioides* DC. is reinstated and *S. canaliculatum* Lindl., an earlier but illegitimate name, is placed into synonymy. *Stylidium scandens* R.Br. is lectotypified and *S. nymphaeum* Wege, a species collected by Robert Brown in 1801 and drawn by Ferdinand Bauer, is newly described. *Stylidium spathulatum* R.Br. subsp. *acuminatum* Carlquist is raised to species level and *S. acuminatum* subsp. *meridionalis* Wege newly described. *Stylidium glaucum* subsp. *angustifolium* Carlquist is similarly raised to species level, whilst *S. luteum* subsp. *glaucifolium* Carlquist retained as a subspecies but transferred to *S. angustifolium* (Carlquist) Wege.

### **Introduction**

Ongoing taxonomic work on *Stylidium* Sw. (Stylidiaceae) has revealed that a significant number of typifications are needed prior to completion of the *Flora of Australia* account of the genus. This paper serves to review the types of names relating to 24 species from southern Western Australia and includes descriptions for five new names.

### **Methods**

This study is based upon field observations; the examination of material housed at PERTH and study of type specimens housed at various national and international herbaria. Herbarium abbreviations

follow *Index herbariorum* (Thiers, continuously updated). Vegetative characters were measured from herbarium material and floral features mostly measured from the following spirit collections (*J.A. Wege* numbers unless otherwise indicated): *S. acuminatum* (Carlquist) *Wege* subsp. *acuminatum* – 1250; *S. acuminatum* subsp. *meridionalis* *Wege* – 782, 785, 793, 811, 823, 1165, 1172; *S. angustifolium* (Carlquist) *Wege* subsp. *angustifolium* – 1569, 1571, 1574, 1575; *S. angustifolium* subsp. *glaucifolium* (Carlquist) *Wege* – 1123, 1133, 1176, 1500, 1565; *S. nymphaeum* *Wege* – 865, 866, 870, *C. Tauss* CT 3-10. Geographic regions follow *IBRA Version 6.1* (Department of the Environment, Water, Heritage and the Arts 2008).

### Typifications

**Styloidium barleei** F.Muell., *Fragm.* 6: 5, t. XLIX (1867). *Candollea barleei* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: ‘In Australia occidentali detexit. *J. Drummond* ... inventore sub numeris 274 et 329 [129] distribute ...’ *Lectotype*: Western Australia, *s. dat.*, *J. Drummond* 274 (here designated: MEL 2069476!; *isolectotypes*: BM!, CGE!, E!, G!, K 00355037!, K 000355038!, LD 1097476!, OXF!, P!, W!). *Paralectotype*: Western Australia, *s. dat.*, *J. Drummond* 129 (K 000060585! MEL 2069475!).

*Typification*. MEL 2069476 is selected as an appropriate lectotype of *S. barleei* since it closely resembles the illustration provided by Mueller and bears his annotation. A Drummond *Styloidium* collection with the number 329 has not been located despite extensive searches at a range of Australian and international herbaria. This number is thought to be a typographical error since the MEL sheet of *J. Drummond* 129 was viewed by Mueller.

**Styloidium breviscapum** R.Br., *Prodr. Fl. Nov. Holland.*: 572 (1810). *Candollea breviscapa* (R.Br.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: ‘(M.) v.v. flor. emarcid.’ *Type specimen*: Bay I South Coast [Lucky Bay, Cape Le Grand, Western Australia, January 1802], *R. Brown* Bennett No. 2608 (*holotype*: BM!).

*Styloidium breviscapum* var. *erythrocalyx* Benth., *Fl. Austral.* 4: 31 (1868). *Type citation*: ‘Fitzgerald Ranges and Cape Arid, Maxwell.’ *Lectotype*: ‘S West end Cape arid Range’, [Western Australia], *s. dat.*, *G. Maxwell s.n.* (here designated: MEL 2046601!; *isolectotype*: K 000060836!). *Paralectotype*: Fitzgerald Ranges, *s. dat.*, *G. Maxwell* 150 (BM!, MEL 672624!), = *S. involucreatum*.

*Typification*. Whilst the type of *S. breviscapum* bears immature fruit rather than flowers, there is no doubt as to the application of this name. Lowrie *et al.* (1999: 101) designated the BM sheet as the lectotype, however, I am not aware of any duplicate material and therefore I have treated this sheet as the holotype.

Upon describing *S. breviscapum* var. *erythrocalyx*, Bentham (1868) cited two gatherings by Maxwell that are referable to two different species: *S. breviscapum* (from Cape Arid) and *S. involucreatum* F.Muell. (from the Fitzgerald Ranges, see under *S. involucreatum* below). To fix the application of this varietal name, MEL 2046601 from Cape Arid, which was viewed by Bentham, is designated as a suitable lectotype since it seems a closer match to Bentham’s description (‘Inflorescence not so dense. Peduncles or scapes less hairy’). Interestingly, Bentham stated that Brown’s collection of *S. breviscapum* is very near his new variety. This statement is best explained upon consideration of the remaining specimens cited by Bentham under *S. breviscapum*, which are all referable to *S. eriopodum* DC.

K 000060836 originated from Mueller's herbarium and bears the annotation 'Cape Arid and Fitzgerald Ranges' in Bentham's hand. The fragments match Maxwell's Cape Arid collection of *S. breviscapum* and not his Fitzgerald Ranges collection of *S. involucratum*, and are therefore interpreted here as duplicate material of the lectotype of *S. breviscapum* var. *erythrocalyx*. I mistakenly annotated this sheet as type material of *S. involucratum* in 2006. This sheet was also annotated by Burbidge in 1985 as a lectotype of *S. breviscapum* var. *erythrocalyx*, however, this lectotypification was never published.

***Stylidium ciliatum*** Lindl., *Sketch Veg. Swan R.* xxviii (1 December 1839); *Candollea ciliata* (Lindl.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882); *Stylidium piliferum* var. *ciliatum* (Lindl.) Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 71 (1908). *Type*: not cited [Swan River, Western Australia, 1835–1838, *J. Drummond s.n.*] (*lectotype, here designated*: CGE!; *isolectotypes*: CGE!, FI 113117!, G-DC!, K 000060728!, M!).

*Stylidium setigerum* DC., *Prodr.* 7(2): 782 (late December 1839). *Type*: 'in Novâ-Hollandiâ ad Swan-river', [Western Australia 1835–1838], *J. Drummond s.n.* (*holotype*: G-DC!; *isotypes*: CGE!; FI 113117!, K 000060728!, M!).

*Stylidium ciliatum* var. *minor* Sond. [published as  $\beta$  *minor*], in Lehm., *Pl. Preiss.* 1(3): 374 (1845). *Type*: In lapidosis montis Barker vel Bokkenbop, Plantagenet, [Western Australia], October 1840, *L. Preiss* 2266 (*lectotype, here designated*: MEL 293336; *isolectotypes*: G!, LD!, P 00313119!).

*Typification.* There are two sheets of *S. ciliatum* at CGE that were viewed by Lindley, one of which was retained in his personal herbarium while the other was donated to the herbarium of C.M. Lemann. Both agree with Lindley's protologue. The specimen retained in Lindley's herbarium has been selected here as the lectotype. De Candolle's *S. setigerum* was published shortly after *S. ciliatum* and is based upon the same Drummond gathering, acquired as part of his first unnumbered series from between Perth to Toodyay and Mogumber, including an area of sandplain scrub (or Guangan) near Bolgart (Erickson 1969; Maslin & George 2004). The designated lectotype of *S. ciliatum* var. *minor* is from Sonder's herbarium and includes a dissected flower in a packet that was used by Sonder to compile his description.

***Stylidium dispernum*** F.Muell., *Fragm.* 4: 93 (1864); *Candollea disperma* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: 'In locis humidiusculis glareosis collium ad flumen Murchison River; Oldfield.' *Lectotype*: near the Murchison River, [Western Australia], *s. dat.*, A.F. Oldfield *s.n.* (*here designated*: MEL 293339!; *isolectotypes*: K 000060577!, MEL 2156168!, ?MEL 2156171!). *Paralectotype*: Gravelly hill near Oolingarra, Murchison, Western Australia, *s. dat.*, A.F. Oldfield 901 (MEL 2156167!).

*Typification.* Several relevant Oldfield specimens have been located. MEL 293339 has been chosen as an appropriate lectotype since it is a flowering collection (the paralectotype is sterile) that conforms to Mueller's description and bears both his annotation and Oldfield's field slip. The slip reads: 'Petals white with a purple spot n[ea]r the base' with the locality given on the reverse as '... near the Murchison River.' K 000060577 was received by the Royal Botanic Gardens Kew from Mueller in 1867 and so is likely to have been used in part by Mueller to write his description. It is comparable to the lectotype in terms of flowering time and plant size and so is treated here as duplicate material.

MEL 2156168 is labelled by Mueller as being from the Murchison River and although the collector is not indicated, I interpret it as an Oldfield collection. Bentham viewed this sheet whilst preparing his *Stylidium* treatment for *Flora Australiensis* and thus it must have collected prior to 1868. James

Drummond is not known to have collected this species and Mueller did not visit the Murchison district until 1877 (Churchill *et al.* 1978). The specimen is fragmentary, comprising inflorescence and leaf fragments; however, it appears comparable to the lectotype and is treated here as duplicate material. MEL 2156171 is a complete specimen with the same label information as MEL 2156168; however, it was not seen by Bentham. This specimen is therefore treated as a possible duplicate of the Oldfield collection. Only one collection of *S. dispernum* by Mueller is known, gathered in November 1877 from the Upper Irwin's River (MEL 2156170).

MEL 293340 and MEL 2156169 were collected by Oldfield from the Murchison River; however, these specimens are annotated by Mueller as the unpublished variety *S. dispernum* var. *humile* and therefore I do not interpret them to represent type material of *S. dispernum*. Like many species of *Stylidium*, individual plant size can be variable both within and between populations and is not considered in this case to be taxonomically significant.

**Stylidium elongatum** Benth., *Fl. Austral.* 4: 11 (1868); *Candollea elongata* (Benth.) F.Muell., *Syst. Census Austral. Pl.*: 85 (1882); *S. crassifolium* subsp. *elongatum* (Benth.) Carlquist, *Aliso* 7(1): 60 (1969). *Type citation*: 'Drummond; Champion Bay, Oldfield.' *Lectotype*: Champion Bay, [Western Australia], *s. dat.*, A.F. Oldfield 734 (*here designated*: MEL 2295765!). *Paralectotype*: W.A. [Western Australia], *s. dat.*, [J. Drummond *s.n.*] (MEL 2258789!).

*Typification*. No type material of *S. elongatum* has been found at K; however, two relevant sheets have been located at MEL. The first of these, MEL 2258789, is fragmentary, consisting of a stem stock with leaves and the lower portion of the scape, the flowering portions of two individual scapes, and an envelope containing leaf fragments. Mueller has annotated the label with the locality 'W.A.' but no indication of the collector is given. Bentham viewed this material—the initial B is evident on the folded corner of the label—and he cited it as a Drummond gathering. James Drummond is known to have travelled to Champion Bay in 1852 as part of his 6th collection between 1850 and 1851 (Maslin & George 2004) and could have made the collection at this time. In view of the apparent lack of duplicate material, it is possible that MEL 2258789 was part of Drummond's personal reference set that was later acquired by MEL. This collection also bears a separate label with the annotation 'This is the original plant' which appears likely to be Drummond's handwriting (Alex George, pers. comm.).

The second sheet in question, MEL 2258789, is once again fragmentary, comprising five mounted plant portions (two stem stocks, two ± sterile scape portions, and one flowering scape portion) and an envelope containing leaf and scape fragments as well as two stem stocks. There are two slips of paper with Oldfield's annotations: one cites the collection number (734), the other the same collection number and a brief plant description ('tufts, fl. red') and locality statement ('nr Champion Bay'). I have chosen this collection as the lectotype of *S. elongatum* since there is no ambiguity over the collector and specific locality information is provided. Interestingly, there are two Mueller labels each bearing Mueller's hand and each with the initial B on the folded corner. It is therefore possible that there are two separate gatherings represented on the sheet, a notion that is perhaps supported by the presence of numerous stem bases. However, it is also plausible that all portions on the sheet represent a single gathering and furthermore, in view of the clump-forming habit of this species, they could potentially have been sampled from a single individual. Since all of the fragments belong to the one species, and no fragments disagree with Bentham's protologue, the entire sheet is designated as the lectotype. This is a pragmatic solution since it would be impossible to accurately assign each fragment, and choosing one fragment as a lectotype would reduce the taxonomic information.

Bentham (1868) noted a second *Drummond* collection (*n.* 170: K 000355125, MEL 2156058) as comparable to *S. elongatum* 'but with a shorter, looser panicle'. This collection is referable to *S. yilgarnense* E.Pritz.

***Stylidium galioides*** C.A.Gardner, *J. Roy. Soc. W. Australia* 27: 198 (1942). *Type*: East Mount Barren, Western Australia, 26 November 1931, C.A. Gardner 2955 (*lectotype, here designated*: PERTH 01008102!; *isolectotypes*: PERTH 01008145!, PERTH 01008129!, PERTH 01008110!, PERTH 01008137!).

*Typification*. PERTH 01008102 has been selected as the lectotype since it is the only type sheet that has been annotated by Gardner. It also bears sketches of the flowers. Gardner described the flowers of *S. galioides* as having two anterior throat appendages and six posterior appendages, and his drawings on the lectotype match this description; however, my observations on this species indicate that it has only four posterior throat appendages (two on each posterior corolla lobe). The number of appendages on the type material could not be confirmed without damaging the material.

***Stylidium glaucum*** (Labill.) Labill., *Nov. Holl. Pl.* 2: 64, t. 214 (1806). *Candollea glauca* Labill., *Ann. Mus. Hist. Nat.* 6: 454, t. 64, Figure 1 (1805). *Type citation*: ‘Habitat in terrâ Van-Leuwin’. *Type specimen*: King George Sound, [Western Australia], Feb. 1803, J.B. Leschenault de la Tour s.n. (*holotype*: FI 113130!; *isotype*: G!).

*Typification*. The type of *S. glaucum* could not have been collected by Labillardière since the species occurs well west of Esperance Bay, his only south-west landfall. Nelson (1974; 1975) correctly suggested that Labillardière, who is known to have used Australian collections other than his own, based his description on a collection by Leschenault de la Tour. Leschenault, who was part of the expedition aboard the *Géographe* and *Naturaliste* under Baudin, called at King George Sound from mid February to March 1st 1803 and is known to have made collections at this time (Nelson 1975). The holotype of *S. glaucum* bears the annotation ‘Habitat in terra van-Leuwin’ and the additional note ‘port du roi georges’ [King George Sound]. A specimen at G, which I interpret as an isotype, is similarly labelled as having been collected from ‘port du roi georges’ and bears the additional annotation ‘1803, M. Leschenault de la Tour’. *Stylidium glaucum*, which occurs in winter-wet habitats, is one of only a handful of triggerplants that would have been flowering in the Albany region during Leschenault’s summer visit.

***Stylidium imbricatum*** Benth., *Enum. Pl.* [Endlicher]: 73 (1837). *Candollea imbricata* (Benth.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type*: King Georges Sound, [Western Australia], s. dat., K.A.A. von Hügel s.n. (*lectotype, here designated*: W!; *isolectotype*: MEL 710000! [fragment in envelope]).

*Typification*. Lowrie & Kenneally (1997: 354) recorded the holotype of *S. imbricatum* as being at K and gave the locality statement as ‘Interior of King George Sound’; however, I have been unable to locate a Hügel collection of *S. imbricatum* at K. It seems likely that an error has been made since there is a collection of this species at K made by Alexander Collie from the ‘Interior of King George Sound’ (K 000355185).

There is relevant Hügel material at both W and MEL. The W specimen comprises a stem portion with several inflorescences and a label in Bentham’s hand. I do not know whether Endlicher sent this material to Bentham in London or whether Bentham examined the specimens on a visit to Vienna. The MEL sheet has a pencil sketch of the plant portion at W plus a packet containing a stem portion and three flowers (presumably fragments from the W specimen). Both the packet and the drawing are annotated by Bentham. This MEL sheet also bears a separate collection of *S. imbricatum* by Harvey which is not type material. I have designated the W sheet as a suitable lectotype of *S. imbricatum*.

since it is the more complete specimen. I mistakenly annotated this specimen as an isolectotype during my visit to Vienna in 2003. Curiously, the timing of Hügel's stay at King George Sound, from 1–11 January 1834 (Clark 1994), does not correspond to our understanding of the flowering time of *S. imbricatum*. Flowering specimens at PERTH have been collected from late February to October, with the majority of records from Autumn (April and May).

***Styliidium involucreatum*** F.Muell., *Fragm.* 1: 154 (1859). *Styliidium breviscapum* var. *involucreatum* (F.Muell.) Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 92 (1908). *Type*: 'In montibus Fitzgerald Range' [Western Australia], *s. dat.*, G. Maxwell 150 (*holotype*: MEL 672624!; *isotype*: BM!).

*Styliidium stowardii* M.B.Scott, *Bull. Misc. Inform. Kew* 1915(2): 91. *Lectotype*, *fide* Lowrie *et al.* (1999: 109): Nangeenan, Western Australia, December 1914, *F. Stoward* 121 (K 000060897!). *Paralectotype*: between Perth and Coolgardie, railway between Cunderdin and Dedari, Western Australia, October 1903, G.H. Thistleton-Dyer 87 (K 000060898!).

*Typification.* I recently examined the holotype of *S. involucreatum* and found that it is not comparable to *S. breviscapum* R.Br. as interpreted by Lowrie *et al.* (1999: 101), but an earlier name for *S. stowardii* M.B.Scott, a species reinstated by Lowrie *et al.* (1999: 109). Historical triggerplant specimens are often difficult to interpret; however, a number of diagnostic features are clearly evident on the type of *S. involucreatum*: the calyx lobes are unequal in length and with somewhat rounded apices; the anterior corolla lobes are less than half the length their posterior counterparts; the posterior corolla lobes are prominently falcate; and the labellum does not have lateral appendages. These features are all characteristic of *S. stowardii*. In contrast, *S. breviscapum* has sepals that are of more or less equal length and with subacute to acute apices; anterior corolla lobes that are shorter than the posterior pair but are not less than half their length; posterior corolla lobes that are only slightly falcate; and a labellum with prominent lateral appendages.

The type of *S. involucreatum* was collected from the 'Fitzgerald Ranges' by George Maxwell, who is known to have traversed widely in what is now the Fitzgerald National Park region (Peter Olde, pers. comm.). *Styliidium involucreatum* is known from this region, with specimens having been collected from within Fitzgerald River National Park (e.g. PERTH 02854813) as well as the Ravensthorpe Range (e.g. PERTH 06107788, PERTH 05284619). *Styliidium breviscapum* is also known from the area, occurring on East Mt Barren (e.g. PERTH 03178846), the Eyre Range (e.g. PERTH 01875167), Whoogarup Range (e.g. PERTH 02854821), and the Ravensthorpe Range (e.g. PERTH 06933017, PERTH 07355513). Maxwell is known to have made collections of a range of plant species from East Mount Barren, Middle Mount Barren and West Mount Barren, but he labelled them as such (Peter Olde, pers. comm.). It therefore seems unlikely that his locality of 'Fitzgerald Ranges' corresponds to the 'Mt Barren Ranges' as interpreted by Lowrie *et al.* (1999: 101).

***Styliidium lepidum*** F.Muell. ex Benth., *Fl. Austral.* 4: 27 (1868); *Candollea lepidum* (F.Muell. ex Benth.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: 'W. Australia, Drummond, n. 114, 3rd Coll. n. 181; Tone and Blackwood Rivers, Oldfield.' *Lectotype*: Tone River, Western Australia, *s. dat.*, A.F. Oldfield 271b (*here designated*: MEL 293363!; *isolectotype*: K 000060803!). *Paralectotypes*: Western Australia, *s. dat.*, J. Drummond 114 (MEL 293359B!); Western Australia, *s. dat.*, J. Drummond 181 (FI!, G!, K 000060802!, MEL 293359A!, NSW!, P!, TCD!); Western Australia, *s. dat.*, J. Drummond s.n. (MEL 293433!); Blackwood River, Western Australia, *s. dat.*, A.F. Oldfield 271c (K 000060803!, MEL 293362!).

*Typification.* Mueller provided this species with its name as evidenced by his annotations on all of the MEL sheets cited above; however, the species was formally described by Bentham, who attributed the name to Mueller. All of the above cited sheets were viewed by Bentham and all are in agreement with his description. MEL 293363A has been selected as the lectotype since it is a good quality collection with locality information and duplicate material at K. Oldfield recorded the habitat of this collection as ‘wet places’ and noted the flowers are flesh-coloured. There are two additional Oldfield collections from the Tone River housed at MEL (*A.F. Oldfield* 271d, MEL 293361A and *A.F. Oldfield* 271e, MEL 293361B). These sheets were not viewed by Bentham and are therefore not accepted here as type material.

***Stylidium limbatum*** F.Muell., *Fragm.* 10: 57 (1876); *Candollea limbata* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type:* [Queen] Victoria Spring[s], [Western Australia], October 1875, *J. Young s.n.* (*lectotype, here designated:* MEL 242995!; *isolectotype:* K 000060891!).

*Typification.* Young’s gathering is represented in the collections at both MEL and K. The latter specimen was received by the Royal Botanic Gardens Kew in December 1886 and so was likely to have been used in part by Mueller to write his description. Both sheets bear annotations by Mueller and are comparable to his description. The MEL sheet has been selected as a lectotype since it was the sheet retained by Mueller.

***Stylidium miniatum*** Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 69–70 (1908). *Type citation:* ‘West-Australien: Ohne Standort (Drummond II. Coll. n. 277!); Distr. Avon: Melbourne, Hügel am Moore River östlich bei Mogumber zwischen Gebüsch auf lehmigkeisigem Boden ca. 175 m ü. M. (blühend Ende August 1901 – Diels n. 4031!, E. Pritzel n. 581!).’ *Lectotype:* In fruticetis Moore River, [Western Australia], August 1901, *E. Pritzel* 581 (*here designated:* W!; *isolectotype:* BM!, E! G!, K 000355138! M!, NSW!, P!, PERTH 01641565!). *Paralectotypes:* Moore River östlich bei Mogumber zwischen Gebüsch auf lehmigkeisigem Boden ca. 175 m ü. M.; August 1901, *L. Diels* 4031 (B, *n.v.*, destroyed in WWII); Western Australia, *s. dat.*, *J. Drummond* 277 (BM!, CGE!, E!, K 000060915!, K 000060917!, LD!, MEL 2295036! W!); Distr. Avon: Melbourne, *s. dat.*, *K.A.A. von Hügel s.n.* (B, *n.v.*, destroyed in WWII).

*Typification.* The type material viewed by Mildbraed at B was destroyed in WWII (Botanical Museum Berlin–Dahlem 1999), except for some fragments of *E. Pritzel* 581 that were acquired by Charles Gardner for the PERTH collection during his terms as Australian Botanical Liaison Officer (Green 1990). Whilst I have not located any duplicates of Diels’ or Hügel’s collections, I have seen numerous sheets of the Drummond and Pritzel gatherings, including specimens at W which have been annotated by Mildbraed as ‘*S. laterilium* Mildbr. *n. sp.*’, an earlier manuscript name for this species. Both the Drummond and Pritzel gatherings match the description provided by Mildbraed; however, the latter is preferable for lectotype designation since its provenance is known. I have selected the W sheet as the lectotype since it is a better quality specimen than that at PERTH.

***Stylidium piliferum*** R.Br., *Prodr. Fl. Nov. Holland.*: 569 (1810). *Candollea pilifera* (R.Br.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation:* ‘(M.) v.v.’ *Type specimen:* King George III’s Sound, [Western Australia], December 1801, *R. Brown* Bennett No. 2583 (*lectotype, here designated:* BM!; *isolectotypes:* BM!, E!, K 000060745!).

*Stylidium piliferum* subsp. *minor* (Mildbr.) Carlquist, *Aliso* 7(1): 40 (1969). *Stylidium piliferum* var. *minor* Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 71 (1908). *Type citation:* West-Australien: King

Georges Sound (R. Brown!); Kent, Hammersley River, auf Sand zwischen lichtem Gebüsch, ca. 250 m ü M. (Blühend im Oktober 1901 – Diels n. 4931). *Lectotype*: King George's Sound, [Western Australia], R. Brown Bennett No. 2583 (*here designated* BM; *isolectotypes*: BM, E!, K 000060745!). *Paralectotype*: Kent, Hammersley River, October 1901, L. Diels 4931 (B, n.v., destroyed in WWII). *Stylidium saxifragoides* Lindl., *Sketch Veg. Swan R.* xxviii (1839). *Type*: not cited [Swan River, Western Australia, s. dat., J. Drummond s.n.] (*holotype*: CGE!; *isotype*: K000060754!).

*Typification*. Specimens of Robert Brown's gathering of *S. piliferum* have located at BM, E and K; all have the small stature typical of this species in the southern part of its range in south-west Western Australia. The sheet at BM with the most individuals and bearing Brown's field slip has been selected as a suitable lectotype.

Brown's collection of *S. piliferum* is one of two gatherings cited by Mildbraed in his protologue of *S. piliferum* var. *minor*. It is likely that Mildbraed viewed a duplicate at B which was subsequently destroyed in WWII (Botanical Museum Berlin-Dahlem 1999). The second syntype, a Diels' collection, was similarly destroyed and duplicate material has not been located. The lectotype of *S. piliferum* has therefore also been selected as a suitable lectotype of *S. piliferum* var. *minor*. Mildbraed's variety was raised to subspecific level by Carlquist (1969), who considered it to represent 'a dwarf race of this species'; however, he failed to consider the relevant type gatherings.

*Stylidium saxifragoides* Lindl. is tentatively placed here as synonym of *S. piliferum* pending further taxonomic study. The type, collected by Drummond as part of his first unnumbered series, originates from between Perth to Toodyay and Mogumber, including an area of sandplain scrub near Bolgart (Erickson 1969; Maslin & George 2004). The *S. piliferum* complex contains a number of new Western Australian taxa and is presently undergoing revision by Allen Lowrie and Kevin Kenneally.

***Stylidium plantagineum*** Sond., in Lehm., *Pl. Preiss.* 1(3): 371 (1845). *Type*: 'In glareoso-lapidosis umbrosis silvae ad clivulum inter Kaudiup et Two Peopled Bay, Plantagenet', [Western Australia], 24 November 1840, L. Preiss 2298 (*lectotype, here designated*: MEL 2156187!; *isolectotype*: FI!, L, LD!, M!, MEL 2156186!, MEL 2156188!, MEL 2156189!, TCD!, W!).

*Stylidium elegans* J.Drumm., *Hooker's J. Bot. Kew Gard. Misc.* 1: 376 (1849). *Type citation*: 'During my late journey to the south, I gathered a most exquisite *Stylidium* in flower.' *Lectotype*: Swan River [Western Australia, 1843], J. Drummond 3: 79 (*here designated*: K 000060253!; *isolectotype*: K 000355009!).

*Typification*. MEL 2156187 has been selected as an appropriate lectotype of *S. plantagineum* since it is part of Sonder's herbarium and bears descriptive information in Sonder's hand along with a packet containing a dissected flower used by him to compile his description.

*Stylidium elegans* was described by James Drummond in a letter written to William Hooker on February 21st 1844, and published in 1849 in Hooker's *Journal of botany and Kew Gardens miscellany*. Drummond wrote:

'During my late journey to the south, I gathered a most exquisite *Stylidium* in flower. For several years I had observed its foliage; but a careful examination of the plant in various situations lead me to the conclusion that the inflorescence is never produced in perfection, except on the second year after the ground has been cleared by fire. The leaves, which shoot up very beautifully, become hard and rigid in the course of two or



three years, and seem incapable of supplying the nutrient necessary to enable the plant to form its flowers and to mature its seeds. I have named it *S. elegans*: its roots are thick and fibrous; the leaves 18 inches long, lanceolate, smooth, and silky; the flowers are rose-coloured, and borne on stalks from a foot and a half to two feet high: on the whole, I consider it to be the finest species of the genus.’

*Styloidium elegans*, the only triggerplant named by Drummond, has not been considered in previous treatments of the genus (Bentham 1868; Mildbraed 1908); however, as noted by Barker & Barker (1990), there is sufficient diagnostic detail to qualify it as validly published under the Botanical Code. Drummond appears to be describing *S. plantagineum*, a magnificent species first published by Sonder (1845) that has relatively few, long, smooth, fibrous leaves and a tall scape with striking flowers. Like Drummond, Greg Keighery (*in sched.*) notes that populations from the Stirling Ranges (PERTH 1031716) failed to flower for numerous successive years. In contrast, I observed a large number of mature flowering plants and seedlings in a post fire habitat in this area in 1998 (PERTH 05595916), although at the time I did not realise the significance of this observation. The ability of this species to resprout from a partially or completely buried stem stock following a fire is evident on some herbarium collections (e.g. PERTH 06639755, PERTH 03172562), in which the leaf bases of the previous season’s growth are scorched. Many perennial triggerplants appear to be disturbance-adapted, occurring in high numbers following temporary habitat perturbations such as fire, including *S. coroniforme* F.L.Erickson & J.H.Willis (Coates 1992) and *S. ferricola* Wege & Keighery (Wege *et al.* 2007). Whilst *S. plantagineum* responds well to fire, it doesn’t necessarily require fire to stimulate flowering.

The following Drummond collections of *S. plantagineum* have been located: 2nd Collection No. 263 (MEL 2156144, MEL 21561445); 3rd Collection No. 79 (K 000060253, K 000355009); 5th Collection No. 350 (CGE, G, FI, K 000060252, K 000060922, P, TCD, W); and *Drummond s.n.* (MEL 2156101; a non-flowering collection). Drummond’s letter to Hooker was written on February 21st 1844, which implies the type of *S. elegans* was collected in late 1843. Specimens from his 3rd Collection are known to have been gathered between 1843 and 1844 from Toodyay to Albany, east to Cape Riche, and in the Bolgart district, and were dispatched to London in 1844 (Maslin & George 2004). Two specimens from his 3rd Collection have been located, both of which were sent to Hooker. K 000060253, which comprises two flowering individuals, has been chosen as the lectotype of *S. elegans* since it is the better quality specimen. Furthermore, on one of the individuals, the previous season’s leaf bases appear to be scorched, supporting Drummond’s fire response observations.

***Styloidium preissii*** (Sond.) F.Muell., *Fragm.* 3: 122 (1863). *Forsteropsis preissii* Sond., in Lehm., *Pl. Preiss.* 1(3): 393 (1845). *Candollea preissii* (Sond.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type*: In clivulo arenoso promintorii Cape-Riche [Western Australia], 22 November 1840, L. Preiss 438 (*lectotype, here designated*: MEL 709983!; *isolectotypes*: LD!, MEL 709982!, ?MEL 709985!, S! W!).

*Typification.* Lowrie & Kenneally (1997: 360) cited the holotype of *S. preissii* as being at MEL; however, there is also material at LD to which Sonder likely had access (Crisp 1983). MEL 709983 is selected as a suitable lectotype since it is from Sonder’s personal herbarium, bears detailed diagnostic information in his hand, as well as leaf and flower sketches.

**Styloidium pritzelianum** Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 66 (1908). *Type citation*: ‘West-Australien: Distr. Stirling: Plantagenet, Denmark, auf hümosem Conglomerat im Walde, beschattet (im Verblühen Mitte Januar 1901 – *L. Diels* n. 2267!)’ (*holotype*: B n.v., destroyed in WWII). *Neotype*: 600 m from Kordabup Road along track into Nature Reserve, track is 3.3 km north of South Coast Highway, north-west of Denmark, Western Australia, 21 November 2007, *J.A. Wege & C. Wilkins* JAW 1498 (*here designated*: PERTH 07854927; *isoneotypes*: CANB, MEL).

*Typification*. The holotype of *S. pritzelianum* was destroyed in WWII (Botanical Museum Berlin-Dahlem 1999) and I have not located any duplicate material. No other collections of this species from Diels and Pritzel’s expedition are known. The neotype conforms to the original description and is from the same vicinity as the original collection.

**Styloidium pseudocaeplitosum** Mildbr., *Pflanzenr.* (Engler) IV. 278 (Heft 35): 56 (1908). *Type*: ‘Südlich der Mündung des Greenough River, östlich von Bukara auf sandigen Hügeln, 50 m ü. M. [Western Australia], September 1901, *L. Diels* 4231’ (*holotype*: B, n.v., destroyed in WWII). *Neotype*: South of Dongara on Eneabba Road, Western Australia, 7 September 1969, *A.M. Ashby* 3013 (*here designated*: PERTH 01875752!; *isoneotypes*: AD!, MEL 2259096!, RSA!).

*Typification*. Neotypification is necessary since the original material is no longer extant (Botanical Museum Berlin-Dahlem 1999) and duplicate material has not been located. No other collections of this species from Diels and Pritzel’s expedition are known. The neotype corresponds with the original description of the species, was collected close to the original locality and is supplemented by duplicate material.

**Styloidium scandens** R.Br., *Prodr. Fl. Nov. Holland.*: 570 (1810). *Candollea scandens* (R.Br.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: ‘(M.) v.v.’ *Lectotype*: banks of Oyster Harbour River, King George III’s Sound, [Western Australia], December 1801, *R. Brown* Bennett No. 2595 (*lectotype, here designated*: BM 000812595!; *isolectotypes*: BM 000812586!, CANB 00279064! DBN, E! K 000060294!, K 000060297!, MEL 2104983!, P 00313126!). *Paralectotype*: banks of the lakes towards Cape How [Lake Powell, Western Australia], December 23–24 1801, *R. Brown* Bennett No. 2595 (BM 000812585!, BM 000812594!, K 000355275!), = *S. nymphaeum* Wege.

*Styloidium scandens* var. [published as β] *humile* Sond., in Lehm., *Pl. Preiss.* 1(3): 381 (1845). *Type*: In subarenosis hieme inundatis districtus Hay [between Balgarup and Lake Matilda, Western Australia], 8 November 1840, *L. Preiss* 2296 (*lectotype, here designated*: MEL 293424!; *isolectotype*: LD! FI!, MEL 293426!, MEL 293425!, MEL 293423!, TCD!, W!).

*Typification*. Robert Brown collected *S. scandens* in December 1801 whilst the *Investigator* was anchored at King George Sound. He made two separate gatherings, the first from the ‘banks of Oyster Harbour River’ at King George Sound and the second from the ‘banks of the lakes towards Cape How’, now known as Lake Powell (Vallance *et al.* 2001: 101). These two collections represent two distinct species, both of which have a scandent habit in which plants cling to surrounding vegetation by means of curled leaf tips; however, they differ in flowering period, plant height and flower morphology. Brown’s King George Sound collection (Figure 1, BM 000812595), which is in late flower and early fruit, is referable to a spring to early summer flowering species that commonly grows to 1 m high and, in the Albany region, has a magenta corolla with two simple throat appendages at the base of the anterior lobes and a column *c.* 9–12 mm long (Figure 2A–D). Brown’s collection from Lake Powell (Figure 1, BM 000812594), which is in early flower, represents a late spring to early Autumn flowering



Figure 1. Robert Brown's type gatherings of *Stylidium scandens* housed at the Natural History Museum, London. The designated lectotype (BM 000812595) from King George's Sound consists of several plant portions, indicated with a black arrow. The paralectotype (BM 000812594) from the Lakes towards Cape How, is a discrete species named herein as *Stylidium nymphaeum*.



Figure 2. *Styloidium scandens*, typical form A – habit (J.A. Wege 844, W of Albany); B – inflorescence (J.A. Wege 1277, south of Stirling Ranges); C – flower (J.A. Wege 844); D – labellum (J.A. Wege 1035, West Mt Barren). *Styloidium nymphaeum* E – inflorescence (J.A. Wege 1181); F – flower, note the prominent throat appendages and crested corolla margin (J.A. Wege 1587); G – flower, note the very long lateral appendages on the labellum (visible behind the poised column).

species which can grow in excess of 2 m high and has a pale mauve corolla with erose margins, six or eight throat appendages, and a column 13.5–16 mm long (Figure 2E–G). It was this larger, more ornate species that was so beautifully illustrated by Ferdinand Bauer (Figure 3).

Examination of Brown's descriptive slips, housed in the Botany Library of the Natural History Museum London, has revealed that he considered naming the larger form as a distinct taxon. There is a separate descriptive slip for the larger form, which Brown gave the name *S. formosissimum*. The field slip on the corresponding herbarium collection is annotated as 'var. major' and a separate annotation slip is labelled 'Stylidium formosum vali[?] aff. *S. scandenti* King George III<sup>d</sup> Sound'. However, Brown was uncertain whether this larger form warranted separate taxonomic status, noting on one of his descriptive slips that Bauer's illustration 'is the larger *S. scandens* perhaps not specifically distinct from the common.' He ultimately included the larger form under his concept of *S. scandens* and therefore both gatherings must be considered type material. His type description is short and could be applied to either form. In keeping with his unpublished observations, I have selected material from the King George Sound gathering as a suitable lectotype of *S. scandens*, and have formally described the larger, more ornate form as *S. nymphaeum* (see new names below). The lectotype comprises several portions, which may or may not be from the same individual, but all are in agreement with one another and clearly part of the same gathering.

*Stylidium scandens* var. *humile* Sond. was named by Sonder (1845) but not recognised in subsequent taxonomic revisions (Bentham 1868; Mildbraed 1908). The type is referable to a low growing form of the species that I have placed under a broad concept of *S. scandens* (see notes below). The type locality (Hay District) is thought to be between Balgarup and Lake Matilda (Marchant 1990), although there are no present-day records from this area. The designated lectotype is from Sonder's herbarium and bears descriptive information in Sonder's hand and a packet containing a dissected flower used by him to compile his description.

*Notes.* *Stylidium scandens* varies in habit, corolla colour, labellum morphology, and throat appendage morphology (Figures 2A–D, 4). The typical form (e.g. *J.A. Wege* 814, 827, 844, 858, 1035, 1076, 1312, 1584) has a scandent habit, magenta corolla lobes with a white throat, two throat appendages (one on each anterior corolla lobe), and a labellum with long (2–3.5 mm) lateral appendages (Figures 2A–D, 4C). This form occurs from the western portion of Fitzgerald River National Park to the Denmark region, including the Stirling Range National Park.

A low growing form (Figures 4A, B) with a sprawling, bushy or semi-scandent habit exists in the Denmark and Mt Frankland regions and west thereof to near Margaret River (e.g. *J.A. Wege* 441, 442, 443, 534, 781, 804, 1264). This form is characterised by medium to pale pink, apricot-pink or yellow corolla lobes with red or pink throat markings, a pair of tooth-like throat appendages on each posterior corolla lobe and short (< 1.5 mm long) or no labellum lateral appendages (Figures 4D–F). The leaves of this low growing form are sometimes shorter than the typical form, and some of the leaves on a given individual may lack the characteristic curled tips of this species; however, leaf length and degree of apical curling are highly variable features, even within individuals. A newly discovered outlying population from near Bannister (*F. Obbens* 30/08) is noteworthy in consistently lacking curled leaf apices (like the allied sandplain endemic *S. nonscandens* Carlquist), although it has flowers that appear to fall within the range of variation seen in *S. scandens*.

In the Denmark region, the difference between the scandent and low growing habit forms can be marked and appears to be related to edaphic conditions, with the typical form occurring in gullies and winter-wet swamps and the low growing form in adjacent upland areas. However, the morphological



Figure 3. Ferdinand Bauer's illustration of *Styliidium nymphaeum*. Reproduced with permission from The Natural History Museum, London.

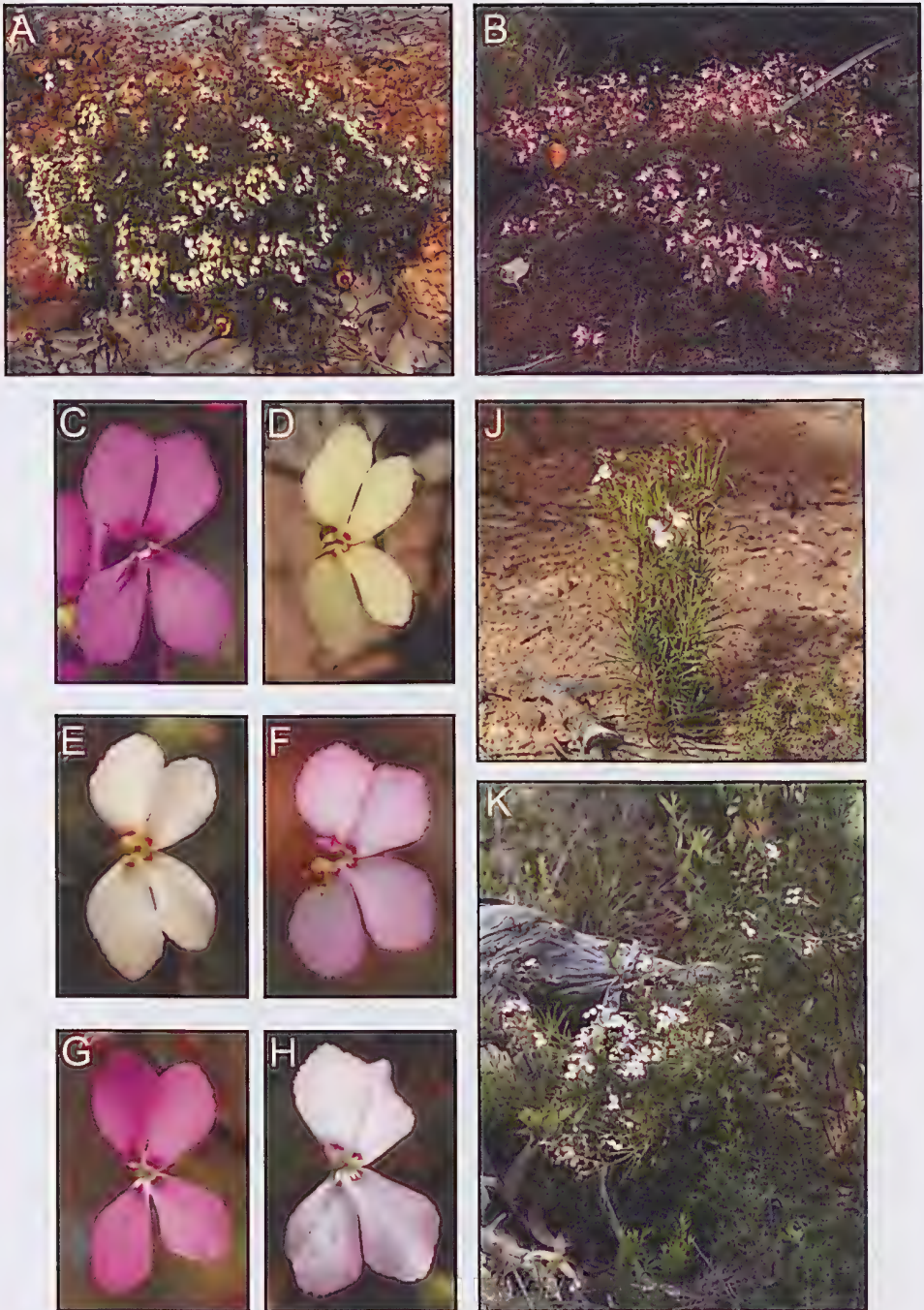


Figure 4. *Stylidium scandens* s. lat. A – low growing form (J.A. Wege 781, E of Margaret River); B – low growing form (J.A. Wege 803, S of Northcliffe); C – flower, typical form (J.A. Wege 844, W of Albany); D – flower, low growing form (J.A. Wege 781, E of Margaret River); E – flower, low growing form (J.A. Wege 1264, E of Margaret River); F – flower, low growing to semi-scandent form (J.A. Wege 1233, S of Busselton); G – flower, scandent form (J.A. Wege 1257, SE Busselton); H – flower, low growing to semi-scandent form (J.A. Wege 1266, SW Nannup); J – compact habit of an individual in a disturbed habitat (J.A. Wege 1482, NW of Nannup); K – a scandent individual from the same population as J in more intact vegetation.

variation present across the entire geographic range of *S. scandens* is complex and difficult to partition into meaningful taxa. The morphology of the throat appendages and the length of the labellum lateral appendages are not always correlated with habit form. For example, there are tall, scandent populations with throat and labellum appendages comparable to the low growing form (e.g. *J.A. Wege* 1257, SE of Busselton; Figure 4G), low growing populations without posterior throat appendages (e.g. *J.A. Wege* 815, N of Walpole) and scandent populations referable to the typical form of the species but possessing posterior throat appendages (e.g. *S. Barrett* 116, Stirling Range). Throat appendage variation within species of *Stylidium*, particularly the presence or absence of small teeth, is not uncommon. That they are variably present in some populations of *S. scandens* (e.g. *J.A. Wege* 825, N of Denmark; *J.A. Wege* 1582, NW of Denmark) suggests that they are not a taxonomically informative in this instance. Similarly, intrapopulation variation in flower colour and the presence and/or length of labellum appendages has also been observed. Moreover, habit can vary within a given population, with the height of mature plants constrained in part by the height of the surrounding vegetation. A more compact habit is prevalent in places where plants have little to no surrounding vegetation to cling to, such as disturbed roadsides and more open areas of vegetation (Figure 4J), but scandent or semi-scandent individuals can occur in the same populations in areas of more intact habitat (Figure 4K). In view of the complex variation exhibited by this species, a broad species concept is preferred at present. A more in-depth study utilising molecular techniques may provide taxonomic clarification.

***Stylidium stenosepalum*** E.Pritz., in Diels & E.Pritz., *Bot. Jahrb. Syst.* 35: 590 (1905). *Type citation*: ‘Hab. in distr. Irwin pr. Mingenew in plagis apertis fruticosis flor. m.’, [Western Australia, September 1901], *L. Diels* 4225. (*holo*: B, *n.v.*, destroyed in WWII). *Neotype*: Junction of Bunney Road and Nebru Road, Wilson Nature Reserve, north-east of Eneabba, Western Australia, 22 September 2009, *J.A. Wege* & *K.A. Shepherd* JAW 1628 (*neotype, here designated*: PERTH 08134790; *isoneotypes*: CANB, MEL).

*Typification*. The type of *S. stenosepalum* was destroyed in WWII (Botanical Museum Berlin-Dahlem 1999) and duplicate material has not been located despite searches at a number of institutions. No other collections of this species from Diels and Pritzel’s expedition are known. The neotype conforms with the original description, and, like the holotype, is from the northern part of the range of this species. A revised description is provided in *Wege* (2006a).

***Stylidium thesioides*** DC., *Prodr.* 7(2): 783 (late December 1839). *Type*: ‘in Novâ-Hollandiâ ad Swan-river’, [Western Australia, 1835–1838], *J. Drummond s.n.* (*holotype*: G-DC!; *isotype*: BM 000797472!, BM 000797473!, CGE!).

*Stylidium canaliculatum* Lindl., *Sketch Veg. Swan R.* xxix (1 December 1839), *nom illeg. non* Poiret (1817). *Candollea canaliculata* (Lindl.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882).

*Typification*. Lindley and De Candolle’s names are based upon the same Drummond gathering, acquired as part of his first unnumbered series (as for *S. ciliatum*; see typification notes above). Whilst Lindley was the first to publish a description for this taxon, his name is illegitimate since it had been previously used by Poiret (1817).

***Stylidium verticillatum*** F.Muell., *Fragm.* 4: 94 (1864); *Candollea verticillata* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.*: 86 (1882). *Type citation*: ‘In montibus Stirling Range ad Mongerup’ [Mondurup Peak, Western Australia], *s. dat.*, *G. Maxwell s.n.* (*lectotype, here designated*: MEL 2156109!; *isolectotype*: MEL 293305!, ?K 000060299!)



*Typification.* The designated lectotype bears locality information in Maxwell's hand and Mueller's annotation '*Stylidium verticillatum*.'

MEL 293305 was also collected from 'Mongerup' and was annotated by Mueller as '*Stylidium aretioides*', presumably an unpublished manuscript name for this species. Whilst the collector is not indicated, the matching locality lends support to my interpretation of this sheet as a Maxwell duplicate. It is unlikely that a collection by James Drummond would bear such a precise locality, although he is known to have collected this species (n. 93, S.W. Australia, K000355195). *Stylidium verticillatum* is endemic to the Stirling Ranges and Mueller did not visit this area until October 1867 (Churchill *et al.* 1978), several years after he named this species. The fact that this specimen bears an unpublished manuscript name therefore suggests that Mueller did not collect it.

K000060299, a specimen from Oldfield's personal herbarium collected by Maxwell from the Stirling Range, is treated here as a possible isolectotype. In the absence of a precise locality statement, it is unclear whether MEL 2156107, collected by Maxwell from 'S.W. Australia', is part of the type gathering.

***Stylidium yilgarnense*** E.Pritz., in Diels & E.Pritz., *Bot. Jahrb. Syst.* 35: 591 (1905). *Type citation:* 'in distr. Coolgardie pr. Goolhi in fruticetis arenosis' [Western Australia], October 1901, *E. Pritzel* 873 (*lectotype, here designated:* PERTH 03171647!; *isolectotypes:* AD 98421092!, AD 98421093!, BM!, G!, K 000060902!, M!, NSW!, P!, S! W!).

*Typification.* The specimen of *E. Pritzel* 873 housed at B was destroyed in WWII (Botanical Museum Berlin-Dahlem 1999); however, some of this material was acquired by Charles Gardner for the PERTH collection during his term as Australian Botanical Liaison Officer (Green 1990). I therefore consider the PERTH duplicate to be the most suitable choice for the lectotype of this species.

### New names

***Stylidium acuminatum*** (Carlquist) Wege, *comb. et stat. nov.*

*Stylidium spathulatum* R.Br. subsp. *acuminatum* Carlquist, *Aliso* 7(1): 38 (1969). *Type:* Between Collie and Harvey, Western Australia, 18 October 1967, *S. Carlquist* 3849 (*holo:* RSA!).

*Perennial herb* 5–45 cm high. *Glandular trichomes* 0.15–0.8 mm long, stalks translucent, heads yellow, turbinoid or discoid; *eglandular trichomes* 0.2–0.8 mm long, multicellular. *Stems* shortly elongated below the leaf rosettes, straw-coloured, ± branching at nodes; internodes leafy, 0.5–8 cm long, with glandular and/or eglandular hairs; stilt roots present. *Leaves* in tufted rosettes, ± persisting into the next growth season, narrowly oblanceolate to oblanceolate or spatulate, flat in T.S., 0.5–3.5 cm long, 1–8.5 mm wide; apex subacute, acute or acuminate, terminating in a callus; margin entire; faintly to conspicuously striate, with dense glandular and eglandular hairs on both surfaces. *Scapes* (1)2–16 per plant, 4–42 cm high, 0.3–1.7 mm wide, often bearing a few scattered sterile bracts, glabrous or with a sparse to dense indumentum of glandular and eglandular hairs throughout, or with hairs restricted to the lower portion; sterile bracts narrowly oblanceolate to subulate, 1.5–11 mm long, glabrous or with glandular and/or eglandular hairs. *Inflorescence* a botryoid or raceme, (2)5–65-flowered; bracts subulate, apex acute, margin entire, 1.2–6.5 mm long, glabrous, glandular, or with glandular and eglandular hairs; bracteoles similar but smaller; pedicels 4–20 mm long, with

glandular hairs, rarely with eglandular hairs. *Hypanthium* turbinoid to clavoid, 1.2–3.5 mm long, 0.6–1.3 mm wide, with faint longitudinal ridges, glabrous, glandular at base or densely glandular. *Calyx lobes* free, apex acute to subacute, margin entire, the 2 lower lobes slightly larger than the upper 3, 1.2–4 mm long, 0.4–0.9 mm wide, glabrous, glandular, or with glandular and eglandular hairs. *Corolla* pale yellow, darker yellow at throat but without discrete throat markings, glabrous; tube 0.5–0.8 mm long; lobes paired laterally, anterior pair longer and slightly broader than the posterior pair; anterior lobes elliptic to oblong, strongly arcuate on anterior margin, 3–6.2 mm long, 2.5–3.7 mm wide; posterior lobes elliptic, 2.8–4.5 mm long, 1.7–2.7 mm wide. *Labellum* reflexed and angled across the calyx, yellow; boss ovate to narrowly ovate, margin entire, 0.5–1 mm long, 0.3–0.6 mm wide, glabrous; terminal appendage 0.4–1 mm long; lateral appendages absent or to 0.6 mm long. *Throat appendages* yellow, irregularly toothed with acute tips, 0.1–0.7 mm long, interspersed with larger swollen mounds, glabrous. *Column* 4.5–6.5 mm long, glabrous; anther locules parallel to column axis, subtending hairs absent; stigma sessile, entire. *Capsules* ellipsoid or clavoid, c. 2–4 mm long excluding calyx lobes. *Seed* brown, 0.3–0.5 mm long, 0.2–0.3 mm wide, longitudinally ridged. (Figure 5)

*Diagnostic features.* Rosetted perennial with narrowly oblanceolate to spatulate leaves bearing a dense covering of both glandular and eglandular hairs; corolla lobes paired laterally, yellow, without red throat markings, and bearing glabrous throat appendages with acute tips; column quite short (4.5–6.5 mm long).

*Notes.* I have previously highlighted my intention to raise *S. spathulatum* subsp. *acuminatum* to species level (Wege 2006b). Unlike *S. spathulatum*, which has a glandular indumentum, *S. acuminatum* possesses both glandular and eglandular hairs, a combination that is uncommon within the genus. Its flowers tend to be smaller than those of *S. spathulatum* and the column is shorter (4.5–6.5 mm as opposed to 7.5–12 mm in *S. spathulatum*). Distinct throat markings are absent in *S. acuminatum*, and the throat of the flower bears conspicuous, irregularly toothed appendages with acute tips. In contrast, the flowers of *S. spathulatum* possess red throat markings and inconspicuous, blunt appendages. The two species share a very similar geographical distribution, ranging from near Albany north to the Collie area although *S. spathulatum* tends to prefer moister habitats. I have not observed the two species growing together, although Carlquist made a mixed gathering of these two species at a site east of Albany (*S. Carlquist* 3979, RSA), suggesting that they can occur in either sympatry or parapatry, at least in this region of the State.

*Stylidium acuminatum* has close morphological affinity to *S. rupestre* Sond., a species that can be readily differentiated by its more or less stoloniferous habit, completely glandular leaf indumentum, red or maroon throat markings, glandular hairs on the tips of the throat appendages, and longer column (8–12 mm). The geographic distributions of these two species are not known to overlap, with *S. rupestre* having a more easterly occurrence across the south coast of the State; however, their ranges almost abut near South Stirling, north-east of Albany.

*Stylidium acuminatum* exhibits geographically correlated variation in its indumentum. The typical form, which is only known from west of Collie, has a very dense indumentum on all plant parts except the corolla. Glandular hairs outnumber the eglandular hairs, so much so that they were apparently undetected by Carlquist (1969). The eglandular hairs are readily observed on the leaves under magnification, but are quite sparse on the scapes, occasional or absent on the bracts and calyx lobes, and apparently absent on the pedicels and hypanthium. In contrast, plants which occur from Margaret River to the Albany region tend to have a higher proportion of eglandular hairs, particularly on the leaves, and notably fewer hairs on the floral parts. The scapes are often glabrous, and when hairs are present they are usually restricted to below the inflorescence or the very base. The hypanthium

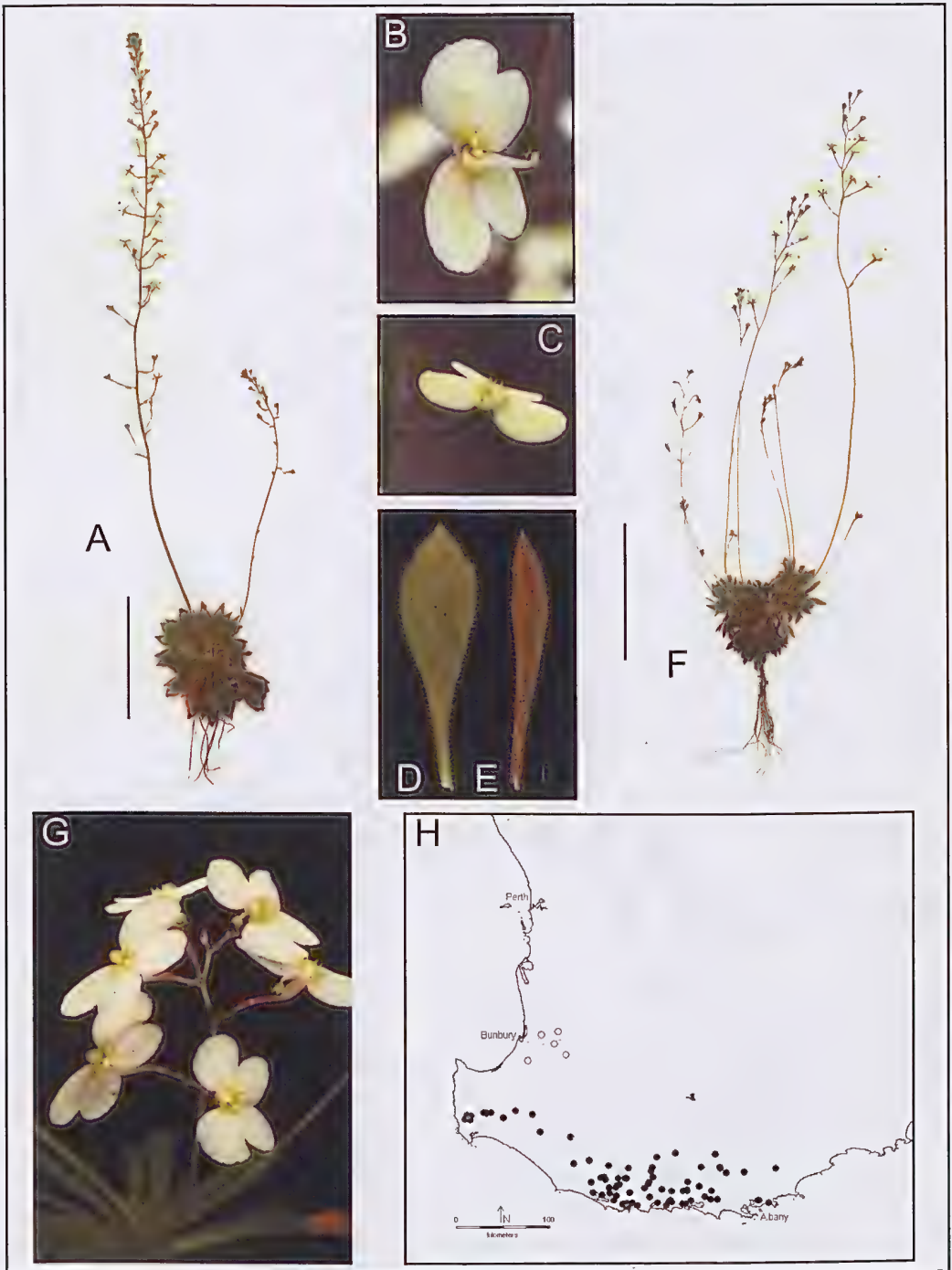


Figure 5. *Stylidium acuminatum* subsp. *acuminatum* (J.A. Wege 1250). A – habit; B – flower, with trigger released; C – side view of flower showing acute throat appendages and densely hairy scape, hypanthium and calyx; D – leaf. *Stylidium acuminatum* subsp. *meridionalis*. E – leaf; F – habit (J.A. Wege 811); G – inflorescence, with glandular hairs restricted to the pedicels (K.R. Thiele 3462); H – distribution of *S. acuminatum* subsp. *acuminatum* (○) and *S. acuminatum* subsp. *meridionalis* (●) in south-west Western Australia. Scale bars at 5 cm (A & F) and 1 mm (D & E).

and calyx lobes are usually glabrous, although glandular hairs may be present near the base of the hypanthium, and the calyx may have very sparse glandular and/or eglandular hairs. Since features of floral morphology are otherwise comparable throughout the geographic range of *S. acuminatum*, the southern, less hairy form is recognised herein at the subspecific level.

***Stylidium acuminatum* (Carlquist) Wege subsp. *acuminatum***

Leaves with a dense indumentum of both glandular and eglandular hairs. Scapes with dense glandular hairs throughout and sparse eglandular hairs mostly below the inflorescence. Bracts, bracteoles and calyx lobes with dense glandular hairs, often with sparse eglandular hairs. Pedicels and hypanthium with dense glandular hair, eglandular hairs absent. (Figure 5A–D)

*Specimens examined.* WESTERN AUSTRALIA: [localities withheld for conservation purposes] 2 Nov. 2005, *E.M. Bennett s.n.* (PERTH); 27 Nov. 1965, *A.R. Fairall* 1723 (RSA); 2 Feb. 1982, *J.M.Koch* 117 (PERTH); 1 Nov. 1991, *A. Lowrie* 451 (PERTH); 1 Nov. 2004, *J.A. Wege* 1250 (CANB, PERTH, MEL).

*Phenology.* Flowering in late October and November

*Distribution and habitat.* Known only from the central Jarrah Forest region west of Collie (Figure 5H) where it grows in lateritic soils on hillslopes and in valleys, in *Eucalyptus marginata* and/or *Corymbia calophylla* forest.

*Conservation status.* Recently listed as Priority One under DEC Conservation Codes for Western Australian Flora. A poorly known, apparently geographically restricted taxon that requires further survey. A record from the 1960s from near Wellington Dam suggests that this species may occur within Wellington National Park; however, field validation is required to ascertain whether this is the case.

*Notes.* This taxon was first collected in the 19th century by Ferdinand von Mueller from ‘Prestons and Collies River’ (MEL 2259092, MEL 2259093), by Alexander Morrison from Boyanup (E) and by Miss Bunbury (no locality: E).

***Stylidium acuminatum* subsp. *meridionalis* Wege, *subsp. nov.***

*Stylidium acuminatum* subsp. *acuminatum* valde similis sed inflorescentiis indumentarum sparsis differt.

*Type:* 5 km east on Weld Road from Roe / Buckle Road junction, north-west of Mount Frankland, Western Australia, 11 November 2002, *J.A. Wege* 811 (*holotype*: PERTH 07940165; *isotypes*: CANB, MEL).

*Stylidium rupestre* auct. non Sond.: Wheeler *et al.* (2002: 910), *pro parte.*

*Stylidium rupestre* Sond. var. *abbreviatum* auct. non Mildbr: Erickson (1958: 111).

*Stylidium* sp. Mt Barker (E.J. Croxford 1906), Western Australian Herbarium, in *FloraBase*, <http://florabase.dec.wa.gov.au> [accessed 6 January 2010]; Wheeler *et al.* (2002: 921).

Leaves with a dense indumentum of eglandular hairs and moderately sparse to very sparse glandular hairs, rarely with glandular hairs absent. Scapes glabrous throughout or with sparse to moderate eglandular and glandular hairs, mostly below the inflorescence. Bracts, bracteoles and calyx lobes glabrous, or with sparse eglandular and/or glandular hairs. Pedicels with glandular hairs, rarely with eglandular hairs. Hypanthium commonly glabrous, occasionally with sparse glandular hairs at base. (Figure 5E–G)

*Selected specimens.* WESTERN AUSTRALIA: near the E end of Porongurup on Chester Pass Road, 15 Oct. 1974, *S. Carlquist* 6033 (RSA); Rocky Gully, 18 Oct. 1951, *R. Erickson s.n.* (PERTH); at crossroads of Two Peoples Bay and Nanarup Roads, Oct. 1972, *S. James* 72 10/46 (PERTH); 20 km NNE of Denmark on Denmark - Mount Barker road, 20 Dec. 1993, *K.F. Kenneally* 11421 (PERTH); Shannon River c. 2 km upstream from the Broke Inlet, 26 Dec. 2007, *K.R. Thiele* 3462 (PERTH); Forest Grove National Park, 12 Nov. 2002, *A. Webb* AW 2219 (PERTH); c. 2.3 km E on Denny Road from Great North Road, ESE of Margaret River, 9 Nov. 2002, *J.A. Wege* 782 (PERTH, MEL); c. 1.2 km ESE on Quartz Road from Coronation Road, E of Manjimup, 10 Nov. 2002, *J.A. Wege* 793 (CANB, MEL, PERTH); c. 4.2 km N on Kordabup Road from South Coast Highway, Kordabup Nature Reserve, 21 Nov. 2007, *J.A. Wege & C. Wilkins* JAW 1496 (CANB, MEL, PERTH).

*Phenology.* Mostly flowering from mid October to December, with one record from late September and one from January.

*Distribution and habitat.* Occurs in the Warren and southern Jarrah Forest regions, extending into the western portion of the Fitzgerald subregion, from just south of Margaret River to north-east of Albany (Figure 5H). Grows in sand over laterite or sandy clay loams on ridges, hillslopes, lowlands, sometimes in association with granite outcropping or adjacent to creeklines. Commonly recorded from *Eucalyptus marginata* and *Corymbia calophylla* forest, often with a dense *Taxandria* understorey. Other associated vegetation includes *E. marginata* and *E. diversicolor* forest over a midstorey dominated by *Acacia* spp. and *E. staeri* forest with *Banksia coccinea*.

*Conservation status.* A common and widespread taxon. No conservation code applies.

*Etymology.* The species epithet means ‘southern’ in Latin and reflects this taxon’s distribution relative to the typical form of the species.

*Notes.* *Stylidium acuminatum* subsp. *meridionalis* is a relatively common taxon, represented by more than 90 collections at PERTH that were housed under 12 different names prior to this taxonomic assessment. It is much more widely distributed than indicated by Wheeler *et al.* (2002) who recorded it as having a restricted distribution in the Mt Barker and Walpole areas, under the name *S. sp.* Mt Barker (E.J. Croxford 1906). This was, in part, due to the incorrect referral of specimens of this taxon to *S. rupestre*. *Stylidium acuminatum* subsp. *meridionalis* has also been commonly confused with *S. spathulatum*, including by Carlquist, who referred a collection from the Porongurups area (*S. Carlquist* 6033) to this species. Both Bentham (1868) and Mildbraed (1908) viewed material of this taxon collected by Drummond (Ser. 3 No. 177: BM, CGE, E, K 000060696, P, TCD, W), treating it under *S. spathulatum*. This taxon was also historically collected by Oldfield from the Mt Barker area (K 003355097). Refer to the notes under *S. acuminatum* for a comparison with both *S. spathulatum* and *S. rupestre*.

***Stylidium angustifolium* (Carlquist) Wege, comb. et stat. nov.**

*Stylidium glaucum* subsp. *angustifolium* Carlquist, *Aliso* 7(1): 40 (1969). *Type*: 6 miles south of Northcliffe, Western Australia, 16 October 1967, *S. Carlquist* 3799 (*holo*: RSA!).

*Perennial herb* 8–75 cm high. *Glandular trichomes* to 0.15 mm long, stalks translucent or yellowish, heads blackish, disciform; eglandular trichomes absent. *Stems* compact or shortly elongated between nodes, reddish-brown, leafless or leafy, ± branching at nodes; internodes to 4 cm long, glabrous; stilt roots present. *Leaves* in erect rosettes, ± scattered beneath, ± persisting into the following growth season, linear to narrowly oblanceolate, flat in T.S., 0.5–8 cm long, 0.7–3(–4) mm wide; apex acute, terminating in an inconspicuous, blunt callus; margin entire or minutely papillose; discolorous, glabrous. *Scapes* 1–7 per leaf rosette, 4–75 cm high, 0.2–2.2 mm wide, often bearing a few scattered sterile bracts, glabrous; sterile bracts linear to narrowly oblanceolate, 2–14 mm long, glabrous. *Inflorescence* racemiforme, (1–)3–65-flowered, glaucous; bracts linear-subulate to narrowly oblanceolate, apex subacute to acute, margin entire, 1.5–14 mm long, glabrous; bracteoles similar but smaller; pedicels 4–20 mm long, glabrous or with sparse glandular hairs at distal end. *Hypanthium* ellipsoid to ovoid, 1.5–2.8 mm long, 0.8–1.7 mm wide, faintly longitudinally ridged, glandular-hairy, sometimes sparsely so. *Calyx lobes* free, apex acute to subacute, margin entire, subequal, 1.8–3.5 mm long, 0.5–0.9 mm wide, glabrous. *Corolla* yellow with maroon throat markings, stained maroon on reverse, glabrous; tube 0.7–1.2 mm long; lobes paired laterally, anterior pair *c.* equal to or a little longer than the posterior pair; anterior lobes elliptic to narrowly ovate, slightly arcuate on anterior side, 3.7–5.5 mm long, 2–3.3 mm wide; posterior lobes elliptic to narrowly ovate, 3.5–5.5 mm long, 1.7–3.2 mm wide. *Labellum* reflexed and angled across the calyx, yellowish-maroon; boss ovate to elliptic, margin entire, 0.5–0.9 mm long, 0.4–0.7 mm wide, glabrous; terminal appendage 0.3–1 mm long; lateral appendages absent. *Throat appendages* 8, tooth-like with truncate to somewhat capitate tips, fused at base, grouped into 2 groups of 3 each 0.5–0.9 mm high, with the anterior-most appendages smaller, 0.1–0.3 mm high. *Column* 7–11 mm long; anther locules parallel to column axis, subtending hairs absent; stigma sessile, entire. *Capsules* ellipsoid, 2–3.5 mm long excluding calyx lobes. Seed brown, ellipsoid to oblong, 0.4–0.5 mm long, 0.2–0.25 mm wide, surface rugulose. (Figure 6).

*Diagnostic features.* A stilted, perennial habit; leaves arranged in tufted rosettes, linear to narrowly oblanceolate, flat in transverse section, glabrous and discolorous (paler on lower surface); unbranched and glaucous inflorescences; yellow corolla lobes with maroon throat markings and a prominent maroon stain on the reverse; 8 yellow or cream and glabrous throat appendages.

*Notes.* *Stylidium glaucum* subsp. *angustifolium* Carlquist and *S. luteum* subsp. *glaucifolium* Carlquist are morphologically more similar to one another than they are to the species they were originally named under. Carlquist's (1969) descriptions of these two taxa are very brief and lack information on the corolla parts. It is therefore unclear whether he closely examined their flowers, which are more or less comparable. I have combined these two taxa into a single species, recognising two subspecies (*S. angustifolium* subsp. *angustifolium* and *S. angustifolium* subsp. *glaucifolium*) that correspond to Carlquist's original taxa. Since *S. glaucum* subsp. *angustifolium* and *S. luteum* subsp. *glaucifolium* were published at the same time, neither name has nomenclatural priority. I have chosen to elevate *S. glaucum* subsp. *angustifolium* to species level since this epithet best describes this newly defined species and because the use of the epithet *glaucifolium* may cause some confusion with the allied species *S. glaucum*. *Stylidium luteum* subsp. *glaucifolium* is retained at subspecific rank and transferred to *S. angustifolium*.

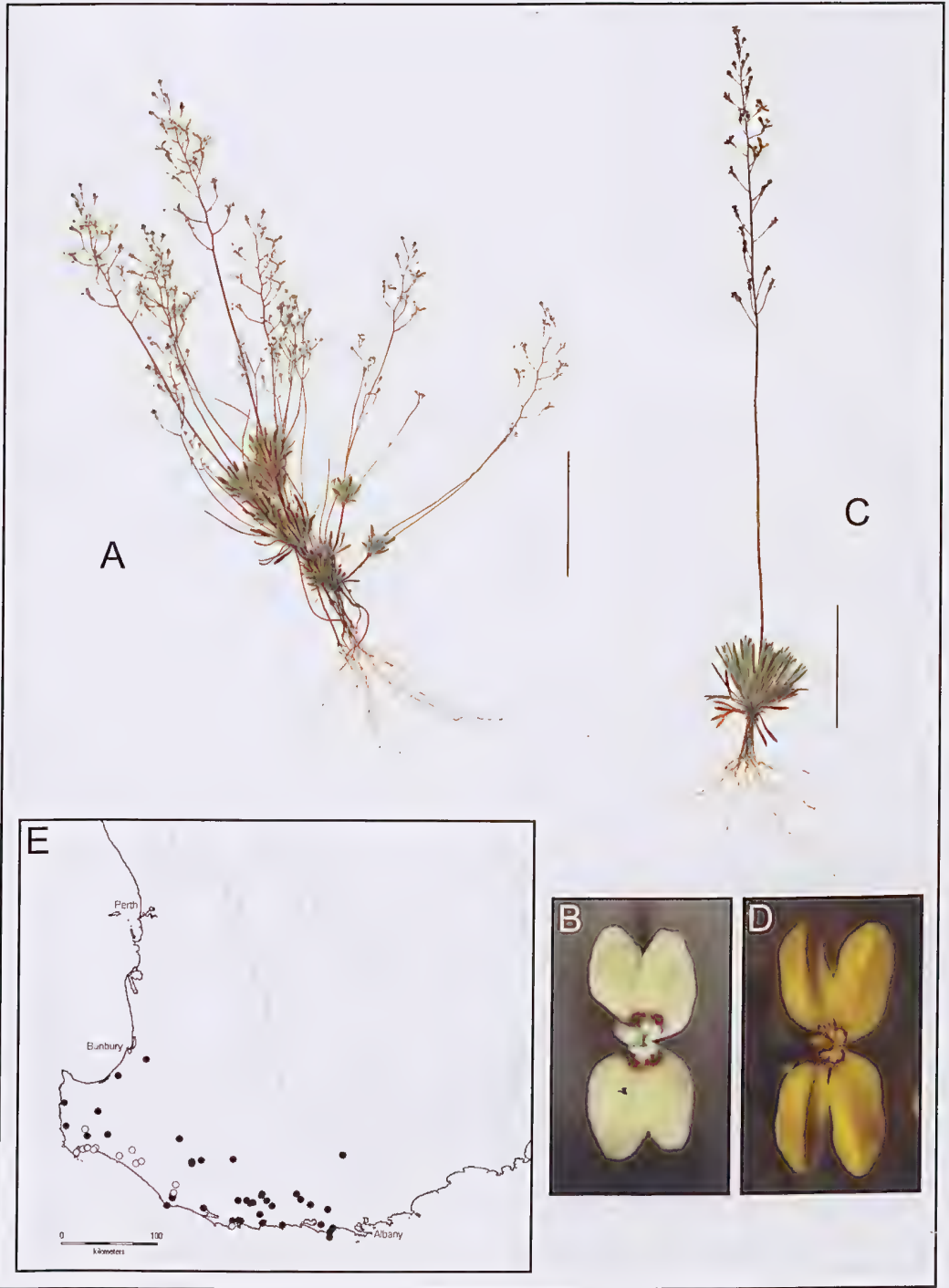


Figure 6. *Stylidium angustifolium* subsp. *angustifolium* A – habit (J.A. Wege 1574); B – flower (J.A. Wege 1569). *S. angustifolium* subsp. *glaucifolium* C – habit (J.A. Wege 1565); D – flower (J.A. Wege 1748). E – distribution of *S. angustifolium* subsp. *angustifolium* (○) and *S. angustifolium* subsp. *glaucifolium* (●) in south-west Western Australia. Scale bars at 5 cm.

*Stylidium angustifolium* differs from *S. glaucum* in both vegetative and floral features. It has a stilted habit in which the leaf rosettes are elevated above the soil on shortly elongated stems, whereas the stems and leaves remain at ground level in *S. glaucum*. The leaves of *S. angustifolium* tend to be narrower (0.7–3(–4) mm wide) than in *S. glaucum* ((2–)3–9 mm), and the corolla is yellow with prominent maroon markings rather than white or mauve. *Stylidium angustifolium* also has a longer column (7–11 mm long as opposed to 5.5–6.5 mm long in *S. glaucum*) and smooth rather than papillose seed. *Stylidium glaucum* has a morphologically distinct hypanthium in which small but distinct protuberances are positioned beneath the calyx lobes on the both the anterior and posterior sides (these are visible in pressed material). *Stylidium angustifolium* has an earlier flowering period than *S. glaucum*, extending from October to January with peak flowering in November and December (*S. glaucum* flowers from January to May, with peak flowering in late January and early February). Whilst these two species share a similar distribution and winter-wet habitat preference, they are not known to co-occur.

*Stylidium angustifolium* is more likely to be confused with *S. luteum*, a species which also has a stilted habit, narrow, glabrous leaves and yellow flowers. *Stylidium angustifolium* differs in a range of features including its discolorous leaves that are flat in transverse section (concolorous and subterete in *S. luteum*), unbranched (racemiform) inflorescences (usually branched (thyrsoid) in *S. luteum*), glaucous buds (buds lacking a white waxy coating in *S. luteum*), hypanthium with glandular hairs *c.* 0.1 mm long (hypanthium with more conspicuous glandular hairs *c.* 0.2 mm long in *S. luteum*), eight throat appendages (six in *S. luteum*), and glabrous seed (conspicuously papillose in *S. luteum*).

The two subspecies of *S. angustifolium* recognised below are defined on differences in habit and flower colour. *Stylidium angustifolium* subsp. *angustifolium* has a lax, branching and nodiferous habit in which short, leafless stems are produced between the rosette nodes (Figure 6A). The leaves are arranged in discrete rosettes at the nodes and are relatively short (0.5–3.5 cm long). Several delicate scapes are produced from each terminal rosette node that are normally less than 20 cm in height. The corolla lobes are pale yellow with maroon markings and cream throat appendages (Figure 6B). In contrast, *S. angustifolium* subsp. *glaucifolium* possesses a more upright, basally-rosetted habit in which the stems are usually more compact and often unbranched (Figure 6B). The stems can be shortly elongated below the leaf rosette and in some cases they branch; however, they tend to be leafy rather than bare. This subspecies also tends to have longer leaves and taller, more robust scapes with more flowers; however, these differences are not discrete. The corolla lobes and throat appendages are usually a bright, deep yellow in *S. angustifolium* subsp. *glaucifolium* (Figure 6E), rarely pale yellow (e.g. *J.A Wege* 1133). The flowers of the two subspecies are comparable in size, shape, throat appendage morphology and column morphology. I had originally intended to treat *S. angustifolium* subsp. *glaucifolium* as a distinct species; however, the similarity in floral morphology combined with the existence of specimens of *S. angustifolium* subsp. *glaucifolium* with more or less leafless stem internodes (e.g. PERTH04543858, PERTH07990286, PERTH04951514, PERTH03178331) suggests that a single species comprising two subspecies is more appropriate.

### ***Stylidium angustifolium* (Carlquist) Wege subsp. *angustifolium***

*Illustrations.* Carlquist (1969) p. 39, Figures 50 & 51, as *S. glaucum* subsp. *angustifolium*; Grieve & Blackall (1982) p. 730, No. 2a, as *S. glaucum* subsp. *angustifolium*.

*Perennial herb* 8–30 cm high. *Stems* internodes 1–4 cm long, leafless. *Leaves* 0.5–3.5 cm long, 0.7–1.5(–2.5) mm wide. *Scapes* (1)2–6 per leaf rosette, 4–22 cm high, 0.2–1 mm wide. *Inflorescence* (1–)3–20(–30)-flowered. *Corolla* pale creamy-yellow. *Throat appendages* creamy-white. (Figure 6A, B).



*Selected specimens.* WESTERNAUSTRALIA: Boggy Lake, 27 Dec. 1957, *D. Churchills.n.* (PERTH); 5.1 km N on Black Point Road from Wapet Track, 30 Jan. 1997, *B. Evans & E. Bennett* P 11.14 (PERTH); Scott River plains E of Augusta, 8 Dec. 1974, *R. Pullen* 9900 (CANB, PERTH); Scott River plains, N of river, 30 Jan. 1965, *R.D. Royce* 8310 (PERTH); 800 m S on Della Rd from Warner Glen Mill Rd, SE of Margaret River, 9 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1569 (CANB, PERTH, MEL); 1.1 km W on Scott River Rd from Milyeannup Coast Rd, E of Augusta, 9 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1571 (AD, PERTH); 2.85 km from Vasse Highway on Scott Rd, D'entrecasteaux National Park, 9 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1574 (CANB, PERTH, MEL); 9.3 km S of Vasse Highway on Wheatley Coast Rd, S of Northcliffe, D'entrecasteaux National Park, 10 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1575 (PERTH, MEL).

*Phenology.* Mostly flowering from late November to January, extending into early February if seasonal conditions allow, with one record from mid October (*S. Carlquist* 3799).

*Distribution and habitat.* Largely restricted to the Warren region, between Walpole National Park and Scott National Park, extending into the southern Jarrah Forest region south-east of Margaret River (Figure 6E). Grows in sand or clayey sand in winter-wet swamps, usually amongst sedges. Associated vegetation includes dense *Taxandria* shrubland, low scrub dominated by *Homalospermum firmum*, and *Beaufortia sparsa* shrubland with emergent *Eucalyptus patens*.

*Conservation status.* Although *S. angustifolium* subsp. *angustifolium* has a reasonably restricted distribution it appears locally common at several sites within the conservation estate. No conservation listing is thought warranted.

*Notes.* Carlquist (1969: 40) describes the glandular trichomes as sessile; however, they are shortly stalked on the holotype and all other collections. Sessile glandular trichomes are not known to occur in the genus.

***Stylidium angustifolium* subsp. *glaucofolium*** (Carlquist) Wege, *comb. nov.*

*Stylidium luteum* subsp. *glaucofolium* Carlquist, *Aliso* 7(1): 36 (1969). *Type:* 1 mile north of Manjimup, Western Australia, 10 November 1967, *S. Carlquist* 4061 (*holo:* RSA!; *iso:* K 000355313!).

*Stylidium glaucofolium* (Carlquist) Wege ms, Western Australian Herbarium, in FloraBase, <http://florabase.dec.wa.gov.au> [accessed 5 March 2010].

*Illustrations.* Carlquist (1969) p. 41, Figures 58–59, as *S. luteum* subsp. *glaucofolium*; Grieve & Blackall (1982) p. 733, No. 10a, as *S. luteum* subsp. *glaucofolium*.

*Perennial herb* (12–)25–75 cm high. *Stem* internodes to 1.5 cm, usually leafy. *Leaves* (1–)2–8 cm long, 1–4 mm wide. *Scapes* 1 or 2(–9) per leaf rosette, (10–)20–75 cm high, 0.6–2.2 mm wide. *Inflorescence* 12–65-flowered. *Corolla* bright, deep yellow, very rarely pale yellow. *Throat appendages* yellow. (Figure 6C, D).

*Selected specimens.* WESTERN AUSTRALIA: E side of Parry Rd, 3.4 km by road SE of South Coast Highway junction (Plot: pi5), 26 Nov. 1990, *N. Gibson & M. Lyons* 915 (PERTH); E side of South Western Highway, 2.25 km S of Deeside Coast Rd intersection (Plot: swh4), 19 Dec. 1990, *N. Gibson & M. Lyons* 1086 (PERTH); Romance Road, ca 1.5 km E of Collis Road, N of Walpole, 30 Dec. 2005, *M. Hislop* 3569 (PERTH); Shelley Beach Road, West Cape Howe, 25 km W of Albany,

7 Nov. 1986, *G.J. Keighery* 8548 (PERTH); Kodjilup Nature Reserve, 12 Dec. 1997, *G.J. Keighery* 15241 (PERTH); Amarillup Swamp NNE of Blue Lake, NNW of Denmark, 12 Dec. 1974, *R. Pullen* 9984 (CANB, MEL, PERTH); 3–5 km from Windy Harbour along road to Northcliffe, 17 Nov. 1982, *A. Strid* 21469 (M, PERTH, S); Forest Road, Crooked Brook Forest, SE of Dardanup, 14 Nov. 2003, *J.A. Wege* 1123 (MEL, PERTH); 700 m W on Cowaramup Bay Rd from Caves Rd, 14 Nov. 2003, *J.A. Wege* 1133 (PERTH); 1.54 km W on Ficifolia Rd from Peaceful Bay Rd, Walpole Nornalup National Park, 4 Dec. 2003, *J.A. Wege* 1169 (PERTH); 300 m S of Mount Chudalup turnoff, Northcliffe – Windy Harbour Rd, 5 Dec. 2003, *J.A. Wege* 1176 (CANB, PERTH); 1.2 km N of Centre Break Rd on Denmark – Mt Barker Rd, 21 Nov. 2007, *J.A. Wege & C. Wilkins* JAW 1500 (CANB, MEL, PERTH); 6 km west on Mowen Rd from Sues Rd, south of Busselton, 8 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1565 (AD, CANB, K, MEL, PERTH).

*Phenology.* Flowering specimens have been collected from mid October to early January.

*Distribution and habitat.* Scattered across the Warren and southern Jarrah Forest regions, from west of Torbay Inlet to near Gracetown, extending north to Crooked Brook Forest near Dardanup (Figure 6E). A collection by Ernst Pritzel (PERTH 03122387) from the Stirling Ranges appears referable to this species; however, there are no recent collections from this region at PERTH. Commonly found growing in sand, clayey sand, or sandy loam on winter-wet flats, at swamp margins and in gullies, more rarely on low rises. Associated vegetation is varied and includes *Taxandria* dominated shrubland, *Eucalyptus marginata* and *Corymbia calophylla* woodland with *Taxandria juniperina*, *Eucalyptus patens* woodland over *Taxandria* spp., open *Melaleuca preissiana* woodland over shrubland or heath, *Melaleuca* heath with tall sedges, *Beaufortia sparsa* scrub over sedges, and sedgeland.

*Conservation status.* Well represented in a number of conservation reserves. No conservation code is warranted.

*Chromosome number.* James (1979) recorded a count of  $n = 11$  from a population near Young's Siding (PERTH 03122530), under the name *S. luteum* subsp. *glaucofolium*.

### ***Stylidium nymphaeum* Wege, sp. nov.**

A *Stylidio scandenti* plantae elatiore, floribus ornatoribus, et columna longiore differt.

*Type:* 650 m north of South Western Highway on North Walpole Road, Walpole Nornalup National Park, Western Australia, 20 January 2003, *J.A. Wege & B.P. Miller* JAW 865 (*holo:* PERTH 07012381; *iso:* CANB, K, MEL, W).

*Illustrations.* Ferdinand Bauer, as *S. scandens* (Figure 3 herein); Ferdinand Bauer, field sketch reproduced in Pignatti *et al.* (2000) p. 103, Fig. 33a, as *S. laciniatum*; Mildbraed (1908), p. 52, Fig. 17A–D, as *S. scandens*.

*Scandent perennial herb* to 2.5 m high. *Glandular trichomes* 0.1–0.5 mm long, stalks translucent, heads reddish, ellipsoid to obloid, with somewhat truncate apices; eglandular trichomes present (tips of calyx), multicellular. *Stems* elongated, pale red-brown, ± branching at nodes; internodes leafy, c. (10–)15–60 cm long (1.5–6 cm between each leaf whorl), glabrous; stilt roots forming from lower nodes, or absent. *Leaves* in whorls, rarely persisting into the next season, linear, abaxial midrib conspicuous, 1.5–7.5 cm long, 0.8–2 mm wide; apex acute, curled; margin entire or minutely papillose, revolute in dried material; glabrous. *Scapes* 1–5 per apical leaf rosette, 6–24 cm long,

(0.7–)1–2.5 mm wide, sterile bracts absent, glabrous. *Inflorescence* racemiform (botryoid), rarely thyrsoïd, (2–)4–60-flowered; bracts linear-lanceolate, apex acute and often recurved, margin entire, 5–23 mm long, glabrous or minutely papillose; bracteoles similar but smaller; pedicels 6–40 mm long, decreasing in length from base to apex, glabrous. *Hypanthium* subglobose to ellipsoid, 2.6–4.5 mm long, 1.8–3 mm wide, smooth, glabrous. *Calyx lobes* free but overlapping one another, apex obtuse and ciliolate, margin hyaline and irregularly crenate, 3 lobes slightly longer than the remaining 2, 2.6–4.5 mm long, 1.4–2.4 mm wide, surface glabrous. *Corolla* pale mauve to medium pink-mauve with a white throat, rarely all white; glandular on margins, on tube near anterior sinus and  $\pm$  on abaxial surface; tube 3–5 mm long; lobes paired laterally, each pair fused at base for *c.* 1 mm, the morphologically upper pair overlapping, the lower pair spreading, margin erose, anterior lobes similar in size to posterior pair; anterior lobes obovate, strongly arcuate on anterior side, 5.5–9 mm long, 3.8–7 mm wide; posterior lobes obovate, 5.5–8.5 mm long, 3.8–7 mm wide. *Labellum* reflexed, boss white to yellowish, ovate, 1.3–2.2 mm long, 0.9–1.2 mm wide; terminal appendage pink to white, 0.7–1.4 mm long, margin glandular; lateral appendages mostly pink, 3–6.7 mm long, with glandular hairs for most of length. *Throat appendages* 6 or 8, the same colour as the corolla, usually glabrous; appendages 1 or 2 at the base of each anterior lobe, the anterior-most appendage petaloid, obovate to elliptic, unequally tapering to an acute apex, margin erose or deeply incised, 1.8–5 mm long, 1.3–2.5 mm wide, occasionally with a few apical glandular hairs, the remaining appendage inconspicuous, lobed or tooth-like, to 1 mm high; appendages 2 at the base of each posterior lobe, each pair  $\pm$  fused at the base, subulate, 0.5–3.5 mm long. *Column* 13.5–16 mm long, with a distinct lateral curve, with glandular hairs from hinge to distal end; anther locules parallel relative to column axis, apiculate, subtending hairs present; stigma capitate, entire. *Capsules* globular, 4.5–7 mm long excluding calyx lobes. *Seeds* pale brown, oblong to elliptic, concavo-convex in T.S., 2–2.5 mm long, 0.8–1.5 mm wide, inconspicuously longitudinally striate, arillate. (Figures 2E–G, 3 & 7B)

*Selected specimens.* WESTERN AUSTRALIA: Nornalup, 21 Jan. 1936, *C.A. Gardner s.n.* (PERTH); Bow River, Dec. 1912, *S.W. Jackson s.n.* (CANB, K, MEL, PERTH); Lake William, West Cape Howe, 9 Jan. 1987, *G.J. Keighery* 9370 (PERTH); SW Plantagenet District, Jan. 1901, *E. Pritzel* 223 (BM, K, M, NSW, P, PERTH, S, W); Creek crossing Pingerup Road about 2 km from Chesapeake Road junction, D'Entrecasteaux National Park, 28 Mar. 2003, *C. Tauss* CT 3-10 (PERTH); 600 m S on Peaceful Bay Rd from South Coast Hwy 20 Jan. 2003, *J.A. Wege & B.P. Miller* JAW 866 (CANB, MEL, PERTH); 3.3 km on Broke Inlet Rd from South Western Hwy, D'Entrecasteaux National Park, 21 Jan. 2003, *J.A. Wege & B.P. Miller* JAW 870 (CANB, MEL, PERTH); 150 m S on Torbay Rd from Coombes Rd, W of Albany, 4 Dec. 2003, *J.A. Wege* 1159 (CAN, MEL, PERTH); Corner of Elleker - Grasmere Rd (E branch) and Lower Denmark Rd, W of Albany, 7 Jan. 2004, *J.A. Wege & B.P. Miller* JAW 1181 (PERTH); Spearwood Creek crossing on Denny Road, NE of Augusta, 28 Mar. 2005, *J.A. Wege & B.P. Miller* JAW 1332 (MEL, PERTH); *c.* 14 km N of South Coast Hwy on Mt Barker Rd, 12 Dec. 2008, *J.A. Wege & R. Butcher* JAW 1587 (PERTH); Walpole-Nornalup National Park, Isle Road, 15 Oct. 1991, *J.R. Wheeler* 2740 (PERTH).

*Phenology.* Flowering specimens have been collected from October through to July, with peak flowering from late December to March.

*Distribution and habitat.* Restricted to the Warren and southern Jarrah Forest regions, extending from near Albany to the Yelverton Forest, south of Dunsborough (Figure 7A). Grows in seasonally inundated swamps and flats, creeklines and waterlogged hill slopes. Recorded from a variety of habitats including dense *Taxandria* shrubland, open Jarrah and blackbutt woodland with *Astartea*, *Anigozanthos* and sedges, *Melaleuca preissiana* woodland with *Taxandria* and *Astartea*, Jarrah forest with a dense *Taxandria* understorey, Karri forest with *Acacia pentadenia*, and *Allocasuarina* woodland with *Agonis flexuosa*.



Figure 7. A – Distribution of *Stylidium nymphaeum* in south-west Western Australia; B – *Stylidium nymphaeum* at a site north of Denmark (J.A. Wege 1587), growing in sympatry with typical *S. scandens* (J.A. Wege 1588) visible below.

**Conservation status.** Locally common and well represented within the conservation estate. Not considered to be at risk.

**Diagnostic features.** A climbing habit which can reach more than 2 m high; elongated stems with leaves in discrete whorls; linear leaves with curled tips; pale mauve or medium pink-mauve corolla lobes with erose (irregularly toothed) margins; six or eight throat appendages, those nearest the labellum erose or deeply incised; a labellum with long lateral appendages (3.8–6.7 mm); a long (14–16 mm), glandular-hairy column; usually summer and autumn blooming.

**Etymology.** The species epithet is derived from the greek (*nymphae*, demi-goddesses who inhabit the sea, rivers, fountains, hill, woods or trees), in reference this species habitat preference.

**Notes.** *Stylidium nymphaeum* is a particularly striking species in view of its height and beautifully ornate flowers. The only other triggerplant that can grow to more than 2 m high is the equally spectacular *S. laciniatum* C.A.Gardner, a species that, in contrast to *S. nymphaeum*, possesses twining scapes and is often leafless when mature. Interestingly, these two species have a similar geographic distribution and both prefer winter-wet habitats; however, I have never observed them growing in sympatry.

*Stylidium nymphaeum* is morphologically allied to *S. scandens* but differs most obviously in having a taller habit (< 1.5 m high in *S. scandens*), larger anterior throat appendages (1.8–5 × 1.3–2.5 mm; 0.5–2.6 × 0.6–1.1 mm in *S. scandens*) with erose or incised margins (usually entire, rarely erose in *S. scandens*), longer posterior throat appendages (0.5–3.5 mm long; to 0.5 mm or absent in *S. scandens*), longer lateral appendages on the labellum (3.8–6.7 mm long; to 3.5 mm or absent in *S. scandens*), and a longer column (13.5–16 mm long; 9–12 mm in *S. scandens*). *Stylidium nymphaeum* also tends to have more prominently erose corolla lobe margins (entire, crenate tending erose in *S. scandens*), longer calyx lobes (2.6–4.5 mm long; 1.8–3 in *S. scandens*) and a longer corolla tube (3–5 mm long; 2–3.5 mm

in *S. scandens*), although these differences are not always discrete. Flower colour can be diagnostic, particularly the pale mauve populations of *S. nymphaeum* (Figure 2E–F), which are discernable from the magenta, pink, yellow and apricot flowers of *S. scandens* (e.g. Figures 2B–C, 4C–H), although some populations of *S. nymphaeum* have a richer colour approaching that in seen in some populations of *S. scandens*, and white flowers have been observed in both species. *Stylidium nymphaeum*, which blooms throughout summer and into Autumn, tends to have a later flowering time than *S. scandens* (October to December), although there is some overlap. The two species have been observed flowering together in December at a site north of Denmark (Figure 7B) without hybridisation.

Ferdinand Bauer's drawing of *S. nymphaeum* (Figure 3), which is housed at the Natural History Museum, London, is arguably the most exquisite of any *Stylidium* illustration. He probably based this illustration on his own collection, a duplicate of which has been examined at Kew (K 000060293). A duplicate is also known to exist at the Natural History Museum in Vienna (Bruno Wallnöfer, pers. comm.); however, this collection was housed separate to the main collection during my visits in 2003 and 2005 and could not be made available for study. Bauer's field sketch was incorrectly identified by Pignatti-Wikus *et al.* (2000: 83; Figure 33a) as *S. laciniatum* C.A. Gardner, and noted to be 'an exception as all species drawn by Bauer were usually described and named by Brown.' *Stylidium laciniatum* occurs from Denmark to the Blackwood River plateau, well west of the expedition's landfall. Refer to the typification notes under *S. scandens* for information regarding Robert Brown's collection of *S. nymphaeum*.

### Acknowledgements

This study was financially supported by the Australian Biological Resources Study (ABRS) and a Specific Nature Conservation Project initiative of Western Australia's Department of Environment and Conservation. I acknowledge supplementary funding by the Menzies Centre for Australian Studies and the Royal Botanic Gardens, Kew during my term as Australian Botanical Liaison Officer. I thank the Directors and staff at all of the cited institutions for their assistance during my visits and/or specimen loans; Paul Wilson, Bruce Maslin, Alex George, Peter Olde and an anonymous reviewer for their respective comments and sage advice; Cate Tauss for her targeted collections of *S. nymphaeum*; and Ryonen Butcher, Ben Miller, Kelly Shepherd and Carol Wilkins for their assistance in the field and constant encouragement.

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